



Does competitive pricing cause market breakdown under extreme adverse selection?

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Abstract

We study market breakdown in a finance context under extreme adverse selection with and without competitive pricing. Adverse selection is extreme if for any price there are informed agent types with whom uninformed agents prefer not to trade. Market breakdown occurs when no trade is the only equilibrium outcome. We present a necessary and sufficient condition for market breakdown. If the condition holds, then trade is not viable. If the condition fails, then trade can occur under competitive pricing. There are environments in which the condition holds and others in which it fails.

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1. Introduction

The presence of adverse selection can cause severe inefficiencies. This is most starkly illustrated by Akerlof's example [1] where adverse selection leads to market breakdown (i.e., no trade is the unique equilibrium outcome). This possibility of market breakdown is particularly salient in financial markets, since private information is a major concern when reallocating risk. Glosten [15] has shown that market breakdown can arise in competitive financial markets under adverse selection. Specifically, market breakdown occurs in a CARA-normal environment, with the notion of competition requiring *separation*, i.e., the equilibria are informationally efficient in the sense

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that the investor's payoff-relevant private information is fully revealed.¹ Since the distribution of private information has unbounded support, adverse selection is *extreme*: for any price there are informed investor types with whom uninformed agents prefer not to trade. As shown by Hellwig [19], this extreme adverse selection is necessary for market breakdown to arise in Glosten's model [15] of a competitive market.

Glosten [15] has shown that a monopoly market maker can sometimes facilitate trade when no trade is possible under his notion of competition. Competition in [15] (and many other models) leads to pricing that precludes cross-subsidization among trades, which we refer to as *competitive pricing*. This raises the possibility that competitive pricing is a contributing factor in the market breakdown found under extreme adverse selection, as it can be under non-extreme adverse selection (see [17,26]).

We study market breakdown in a finance context under extreme adverse selection with and without competitive pricing. We find that competitive pricing is *not* a contributing factor in market breakdown: If trade is *viable* (in the sense that market makers do not lose money in expectation) then trade can also occur under competitive pricing. The key to this finding is that competitive pricing does not require informational efficiency.

Our environment generalizes Glosten [15]. There is a single informed, risk-averse strategic trader (with CARA, i.e., constant absolute risk aversion, preferences) and risk neutral market makers. The informed trader can act either as a buyer or as a seller; there are no restrictions on order sizes. There is a two-dimensional adverse selection problem in which the informed trader has private information about the expected payoff of the risky asset as well as about his endowment. In Glosten [15], both of these random variables are normally distributed and the informed trader's private information can be summarized by a one-dimensional normally distributed type. Following Biais et al. [6], we make no parametric distribution assumptions, so that the summarizing one-dimensional type need not be normally distributed (in fact, there are no essential restrictions on the one-dimensional-type distribution beyond symmetry and finite variance). This generalization from Glosten's [15] environment is important, because market breakdown under competitive pricing cannot occur in his environment, but can occur in the generalization.

We view the unbounded-type space as an idealization of the adverse selection problem caused by large, but bounded-type space. The model with unbounded-type space should thus be the limit of models with bounded-type spaces. However, as we discuss in Remark 4.1 and Section 5.2, the nature of this limit model is unclear. Consequently, like Hellwig [19], we study extreme adverse selection as the limit case of a sequence of markets in which bounded supports of the distribution of the informed trader's information become arbitrary large.

We identify a condition, the *market breakdown condition*, under which trade is not viable (Theorem 4.1). Moreover, if the condition does not hold, then trade can occur under competitive pricing (Theorem 4.2). The condition relates the distribution of the informed trader's information to a simple measure of the gains from trade. It is satisfied for a class of fat-tailed distributions, including Pareto (Theorem 4.3), while it fails for thin-tailed distributions (Theorem 4.4), such as normal (Glosten's case [15]). The market breakdown condition is thus not vacuous—there are environments in which the condition holds and others in which it fails.

After describing the environment in the next section, we study non-extreme adverse selection (i.e., bounded support distributions of the informed trader's information) in Section 3. In addition to being an important benchmark, this analysis underpins our limit analysis. We define the central

¹ The literature extending Glosten's result (i.e., [4,5,36]), also focuses on separating competitive equilibria in CARA-normal environments.

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